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MAJOR FRANK E. ROGERS, MC

Historical Division

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Malaria Control, Hq Base G, APO 503 565

25 Sept 1944

We wish to call attention to the change of address of this office. Malariologists will remind all malaria units and hospital registrars of this fact.

"Malaria Control, Hq Base G, APO 565"

Hollandia
New Guinea

Recently Malaria Survey and Control Unit personnel have been observed around work areas without shirts.

Clothing discipline has always been an acute problem and difficult to enforce. When G.I. Joe sees the malaria personnel violating the rules, it is bound to undermine whatever discipline has been established.

Remember that you are always on the spot and must set the example for your areas. Let's keep those shirts on and make your job easier.

Me too, G. L. Orth!

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Captain Sidney M. Marks of the 5th Malaria Control Unit, now at Biak, sent a snapshot in to this office of a novel advertising idea to assist in malaria discipline.

He had prevailed upon a native of his crew to wear a white cotton undershirt on which had been stenciled the following:

Don't go Native
Keep your shirt on
Prevent Malaria

Probably inspired by the Broadway "sandwich man", never-the-less, it has created a good deal of interest among the troops and should prove to be an effective medium of propaganda.

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Are your advertising signs clean and effectively placed?

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ARMED
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SEP 10 1952

MEDICAL
LIBRARY

To all Malaria Survey Unit Commanding Officers

A critical shortage of paper exists in this theater and it has been suggested that a large saving could be effected if the "larval data forms" submitted by survey units be consolidated into summarizing forms. The typical breeding places have been well established, and no need exists for continuance of detailed reports on this subject. However, a record may be maintained in your files, if you so desire.

The elimination of unnecessary paper work should enable the units to concentrate more energy on their field work.

Any suggestions for further curtailment of "paper work" will receive careful consideration. Let's hear from you --- .

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Notes on Life History of Anopheles punctulatus farauti Lav.

by

T/4 Hamilton Laudani and Sgt. Denton K. Klahn
3rd Malaria Survey Unit

Of more than usual interest because of the circumstances under which conducted, was a field life history study completed during the month. The study was made in a shallow ground pool in direct sunlight. All water percolated out of this pool on three different occasions for periods at least 4 to 6 hours. Each time the pool was found empty, water was added, reviving the larvae.

Under observation for some time, the study pool was found to contain large numbers of newly hatched anopheline larvae on 12 August 1944. Daily thereafter, the pool was sampled and a number of larvae removed for microscopic examination. By charting the relative proportion of stages present each day, the periods required for each could be determined with accuracy. The tabulation below shows average results, with the length of the egg stage as determined by other tests added. A total of 18 of the original stock in the pool was allowed to pupate.

Egg Stage:	1.5 days
1st Instar:	2.0 days
2nd Instar:	1.5 days
3rd Instar:	1.5 days
4th Instar:	3.0 days
Pupal Stage:	<u>1.0 days</u>
Total	10.5 days

These results conform closely to results of previous tests in which an average of 10.9 days from oviposition to adult was obtained at temperatures fluctuating around 26° C. The occasional drying up of pools apparently did not delay development.

The average period from hatching to adult of 9 days with a minimum observed period of 7 days reaffirms the wisdom of a weekly oiling schedule. Eggs may remain viable on moist soil surfaces for as long as 2 weeks and hatch soon after water accumulates. This fact requires that the period from hatching to adult be considered the critical one rather than the period from oviposition to adult in determining frequency of oiling.

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The following "Methods and Procedures" of mounting mosquito larvae was contributed by the 37th Malaria Survey Unit.

1. A technique for mounting mosquito larvae which appeared in Science 99 No. 2567 entitled "A Rapid Method of Making Permanent Mounts of Mosquito Larvae" by W. W. Middlekauff, Captain, Sn C, has given very satisfactory results in this laboratory.

- a. Larvae are killed in hot water and then placed in 70% ethyl alcohol for 15 minutes.
- b. Specimens are then placed in 95% alcohol for 5 minutes and from there to absolute alcohol for 5 seconds.
- c. Specimens are then placed in creosote USP until cleared. In the case of delicate specimens the creosote is diluted with an equal quantity of 100% alcohol and the larvae transferred to this mixture before place in pure creosote.
- d. Larvae are then mounted in Canada Balsam.

2. Through the courtesy of Anselm M. Keefe, Lt Col, Chaplain C, a supply of Poly-Vinyl-Alcohol-Lacto-Phenol solution has just been received. This solution is highly recommended for mounting mosquito larvae.

Once again we are indebted to Chaplain Keefe of the 135th Medical Group. His co-operation and goodwill has been a constant encouragement to many of the malaria personnel. We would like to extend a sincere and hearty "thank you, Padre" on behalf of all the units engaged in malaria control work. With such staunch support, we are sure we can "convert" the mosquitoes to our "way of life."

Attitude of American Troops Toward Malaria Control

In a recent publication of the War Department (Monthly Digest of WD Studies on the Attitudes of American Troops), some interesting points were presented in regard to the attitude of American troops toward malaria control. A study was made of infantry combat veterans in two Pacific divisions, additional data was obtained from a cross-section of the enlisted men in malarial zones, most of whom have not seen combat.

To test their knowledge of malaria control, the men were given a "malaria information" quiz. While a majority gave the correct answers to each of the questions asked, many reveal that they have been either poorly informed or misinformed on the subject. For example, 9% of those who had had malaria, and 8% of those who had not, said that protective clothing, nets, sprays and repellents were of little help, that getting malaria was mostly a matter of luck.

A greater degree of misinformation is evident in men's answers to questions regarding atabrine. A glance at the following statements shows that there are substantial percentages among the men in malarial zones who have each of the above misconceptions.

- 22% say that when atabrine is used it is less necessary to use other preventive measures. This answer is, of course, false.
- 50% answer incorrectly that taking atabrine regularly for more than a few weeks is likely to have a bad effect on a man's health. The fact is that there is no evidence that atabrine is injurious to one's health. Atabrine occasionally causes mild temporary unpleasant effects but these soon disappear. Many men are obviously in need of more information about the harmlessness of atabrine.

This need for more information is echoed in men's answers to other questions about malaria. Asked "If some men do not take proper precautions against malaria what do you think is the main reason for this?" The men replied:

- (a) They don't know enough about what they should do -- 15%
- (b) They think they may get malaria anyway -- 25%
- (c) They don't really care whether they get malaria or not -- 21%
- (d) It is just too much bother to take proper precautions -- 22%
- (e) Miscellaneous or no answer -- 17%

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WARNING!

Recent information from the Surgeon General's Office reveals that DDT solution in oil is **corrosive** to metal. All units mixing DDT in drums must be sure not to return drums to the Quartermaster but to keep them for future use, i.e. transfer unmixed oil to drums previously used for DDT.

In this way we can eliminate the slight possibility of damage to planes and engines that might be caused by the residual DDT in drums used again for regular supply purposes.

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Collections of the Sandfly, *Phlebotomus*.

by

5th Malaria Survey Unit

We reported in July that small midges of the family Psychodidae had been collected in the Dobodura area. These specimens have been carefully studied and identified as belonging to the genus *Phlebotomus*. Our determinations have been confirmed by Lt. Col. C. B. Phillips, U.S. Typhus Commission, who worked with *Phlebotomus* in the Middle East and Sicily. Specimens of *Phlebotomus* have now been collected at several places in Dobodura region, both near the camp site of the 11th Airborne Division and in locations as much as 15 miles from the Division Area. At least two species have been taken, one a large species resembling *Phlebotomus Papatasi*, while all the other specimens have been smaller and probably belong to the "minutus" group of these midges. The sandflies have been found resting in tree holes near the ground and on the shaded buttresses of jungle trees. As yet none has been taken in covered fox holes or fallen hollow logs. These trees have usually been located in the rain forests both at sea level and on low mountains. However, trees at the edge of the rain forest have also yielded some sandflies. Some collections have been made within 20 yards of occupied tents and a few specimens have been filled with blood. It was not determined whether they had fed on humans.

Our method of collecting is to spread a white linen sheet at the bottom of a tree hole or on the ground between buttresses and then spray the holes or buttresses thoroughly with an aerosol freon bomb. *Phlebotomus* specimens are sorted from the numerous other insects that also drop on the sheet and die. Some buttresses and tree holes have yielded as many as 12 - 15 sandflies.

Recently, one of us had an opportunity to visit Port Moresby, Nadzab, Lae and Finschhafen. At all these bases *Phlebotomus* of the "minutus" type were taken in places similar to those where collections were made at Dobodura. Since most of these bases are over one hundred miles apart, it is reasonable to suspect that sandflies will be collected in many other areas of New Guinea and probably in the neighboring islands.

Specimens from our sandfly collections have been forwarded to taxonomists in Australia for identification as to species. We also plan to send additional specimens to Diptera specialists in the United States.

In consulting literature kindly placed at our disposal by Lt. Col. Phillips it was found that *Phlebotomus* had previously been collected at one place in New Guinea. Some years ago Dr. W. M. Strong of Port Moresby sent a specimen of this midge to G. F. Hill, an Australian taxonomist. This specimen was described by Hill but not named, in a paper dealing with the Australian species. Later Dr. Strong collected additional specimens at Port Moresby and gave them to Dr. S. M. Lambert, of the Rockefeller Foundation, when he was in Papua making surveys of hookworm infestation in the natives. Dr. Lambert took these midges to the United States and nothing has apparently been heard of them since.

The finding of *Phlebotomus* so widely distributed in New Guinea at once brings up the question as to whether they are vectors of sandfly fever on this island. Since some medical officers have already reported fevers among our troops which they suspected might be due to this virus, the known presence of *Phlebotomus* adds further support to this suspicion. However, it remains to be shown whether these sandflies are carrying the virus and, if so, which particular species are involved. This will require a great deal of field, laboratory, and clinical study.

If it is demonstrated that sandfly fever is being transmitted in New Guinea it should be possible to identify a portion of the undetermined fevers of short duration that are so numerous among our troops and those of the Australian Army.

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Request for Phlebotomus Specimens.

The Fifth Malaria Survey Unit wishes to study and identify specimens of Phlebotomus from as many locations in the Pacific as possible. All survey units are invited to send representatives of collections that may be taken at their bases and nearby islands to the Fifth Survey at APO 468. Specimens should be preserved in 70% alcohol. A ball of absorbent cotton should be placed in the vials and pushed down into the alcohol to prevent the specimens from being violently shaken about en route.

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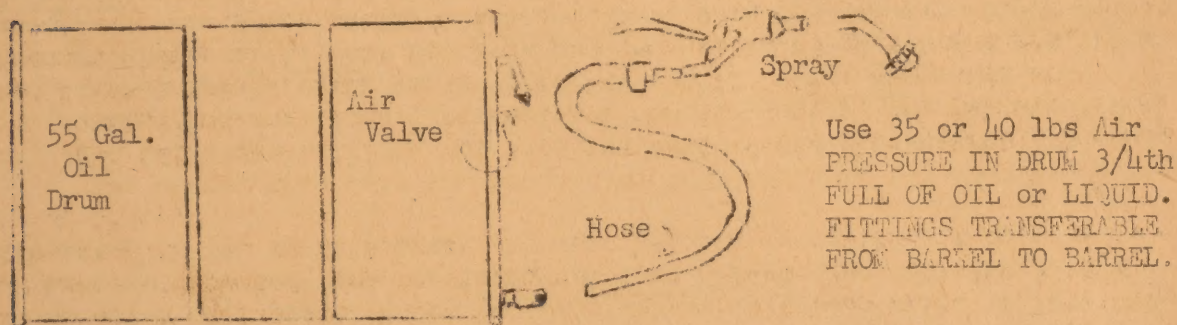
FORCE FEED OIL SPRAY

The following is from Captain E. F. Gabrielson, Sn.C., CO of the 81st Malaria Control Unit.

A force feed sprayer was constructed for use on wheel ruts and other small bodies of water by placing a valve stem from salvaged inner tube in a 55 gallon drum fitting and a hose connection in the other barrel fitting. The barrel is then filled with approximately 40 gallons of oil. Air pressure obtained from any second echelon shop compresses the air to approximately 40 pounds per square inch pressure in the drum.

a. This apparatus will continue to function as a light weight force feed sprayer for about $1\frac{1}{2}$ hours. Then the barrel is refilled with oil and air. This device is extremely useful in spraying roadside ditches and wheel ruts. The drawing below shows details.

FORCE FEED OIL SPRAY



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Survey of Intestinal Parasites

by

Major Harry J. Bennett, Sn.C.
1st Malaria Survey Unit

The large number of patients admitted to the 37th Infantry Division Clearing Company within the last few months for amoebic dysentery and other parasitic infections indicated that a survey for intestinal parasites should be made. All diagnoses of amoebic dysentery by the Clearing Company had been made by study of the living amoebae in warm preparations because no supplies of equipment were available for making stained preparations and no laboratory personnel had been trained to read such preparations. A small amount of supplies were obtained initially for the purpose of confirming all diagnoses of amoebic dysentery made by the Clearing Company.

The survey constituted the principal objective of the laboratory and in the period 22 July - 31 August 1944 five hundred and sixty three food handlers and several other men were examined for intestinal parasitism. It was necessary to train technicians and as a consequence progress has been relatively slow. The technique of examination is as follows; a fresh smear and an iodine stained smear are made on the same slide and both smears

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are studied carefully. If any protozoan parasites are noted two smears of the fecal specimen are made and stained with iron haematoxylin for further study. All species identifications were made from such preparations. The zinc flotation technique has been used for levitation and concentration of protozoan cysts and helminth eggs. It is believed that these techniques will reveal approximately fifty percent of the amoebic carriers since this survey is based on the examination of a single specimen. However, when there was reason to suspect that a man was positive for Endamoeba histolytica but no species identification could be made repeat specimens were requested. Fifty four of those examined submitted from two to four specimens and of these twenty proved to be carriers. To make the survey exhaustive it is believed that at least five fecal specimens should be submitted for each individual. Two hundred and forty eight or forty four percent of the five hundred and sixty three food handlers examined were recorded as negative for intestinal parasites. Three hundred and fifteen or fifty six percent were positive for one or more organisms. Some individuals were positive for as many as five pathogenic and nonpathogenic forms.

Twenty seven confirmations were made for the 37th Infantry Division Clearing Company but seven of these had been detected in the survey. Fifteen examinations were made for the 21st Evacuation Hospital of which nine were positive for E. histolytica, two for Strongyloides stercoralis and one for Necator americanus. Four of the patients positive for E. histolytica were found in the survey. Three cases of amoebic dysentery were confirmed for the Americal Infantry Division. Fourteen other men were examined and of these seven were positive for E. histolytica. A total of thirty five cases of amoebic dysentery and carriers were thus detected in addition to those tabulated in the chart below.

The charts show only the results of the survey of the food handlers in the 37th Infantry Division. Of the five hundred and sixty three examined one hundred and seventeen were positive for E. histolytica, one hundred and fifteen for E. coli, one hundred and ninety for E. nana, seven for Iodamoeba butschlii, four for Trichomonas sp., thirty seven for Necator americanus and four for fly larvae of undetermined species. An observation on the distribution of E. histolytica is probably indicative of the source of infection. The food handlers of some companies were infected almost exclusively by large races while those of other companies were infected by small races of the same degree. The conclusions to be drawn are that mass infection of the food handlers occurred at one time in a particular situation or that one or more food handlers who were infected with E. histolytica and not with E. Coli served as the source of infection for the other food handlers of the unit. The total incidence of E. histolytica, 20.7 percent, is much higher than is expected in the age group represented but on the other hand that for E. coli, 20.4 percent, is the expected one. Records kept by the writer on one thousand and eighty patients examined by him admitted to the Station Hospital, Camp Wheeler, Ga. for gastrointestinal disturbances in the fall of 1942 showed that the incidence of E. histolytica was 2.5 percent and that of E. coli was 19.6 percent.

Preliminary tests of the base water supply for protozoan cysts and helminth eggs has been made with negative results.

The organizations included in the charts below are the Division Headquarters, the 129th, the 145th, and 148th Infantry Regiments. The conditions under which the latter two regiments have lived since arrival overseas have been very much the same and it will be noticed that the incidence of parasitism is very similar. It is very probably that these two regiments were initially infected by the various parasites at about the same time and under the same conditions.

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CHART I

Total Incidence of Intestinal Parasites in Food Handlers

Organism	No. Exam.	No. Pos.	Percentage
<i>Endamoeba histolytica</i>	563	117	20.7
<i>Endamoeba coli</i>	563	115	20.4
<i>Endolimax nana</i>	563	190	33.3
<i>Iodamoeba butschlii</i>	563	7	1.2
<i>Trichomonas</i> sp.	563	4	0.7
<i>Necator americanus</i>	563	37	6.5
Fly larvae	563	3	0.5

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THE PROBLEM OF MALARIA IN THE PHILIPPINES ✓

by

Capt. Karl V. Krombein, Sn.C., 32nd Malaria Survey Unit

In our control work in New Guinea we have had to deal with a vector, Anopheles punctulatus and subspecies, which breeds in almost any type of standing water from side pools in stream beds to tire ruts and artificial containers such as oil drums. Obviously our control work here has had to be periodic oiling, drainage where feasible, filling of tire ruts and elimination of breeding in oil drums by punching holes in the bottoms or stacking the drums on their sides. This type of control has also resulted in the destruction of numerous pest mosquitoes having similar breeding habits.

In the Philippines the principal vector is Anopheles minimus flavirostris. A. maculatus and A. mangyanus are also suspected of being important vectors in the Philippines. All three species show a preference for breeding in running streams and less commonly in irrigation ditches. Minimus and mangyanus prefer shaded streams among exposed tree roots on other vegetation. The indications are that maculatus in the Philippines breeds in shaded streams as well as those exposed to sunlight, though in other parts of its range it is typically a sunlight breeder. Minimus has been recorded from nearly all islands of the Archipelago; maculatus and mangyanus are apparently more restricted in distribution and have been recorded from half and quarter of the islands respectively. Minimus and mangyanus breed in the foothills to an altitude of 2000 feet; maculatus breeds to an altitude of 5000 feet, though not abundantly at the higher levels.

The most effective means of controlling the stream breeding has been found to be the use of fluctuating water levels by dams coupled with the cleaning of vegetation from the edges of the stream below the dam. The flushing should be done periodically, at a minimum of once a week. Where possible, an automatic gate or siphon should be installed in the dam to regulate the flow. This method of control has been used very effectively in the Philippines prior to the war and captured Japanese maps of these areas show that they also have installed a number of dams for mosquito control. In order to minimize Anopheline breeding in the impounded waters it is recommended that such dams be placed as high upstream as feasible. Herms and Gray state that a siphon having a reservoir capacity of 3000 gallons is sufficient to control breeding in a stream 2 feet wide for a distance of 1/2 to 3/4 mile on relatively flat ground.

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MEDICAL ENTOMOLOGY OF THE PHILIPPINE ISLANDS

(Extracted from Report of Medical and Sanitary Data on
the Philippine Islands, S.G.O., 8 May 1944)

Anopheles

Twentynine species and subspecies of anopheline mosquitoes are reported from the Philippines, ten of which belong to the subgenus Anopheles,

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and nineteen to the subgenus Myzomyia. The most important group of anophelines is the stream-breeding funestus-minimus subgroup, which includes A. minimus flavirostris, A. mangyanus, and A. filipinae. A. minimus flavirostris which is found throughout the Islands, is by far the most important and dangerous vector of malaria in the Philippines. A. mangyanus (Myzomyia) is found in many malarious areas, and is probably a vector, though not a common one. Reports do not agree as to whether A. filipinae carries malaria or not. Prior to 1932 it was not thought to be a vector. At that time, however, it was found in large numbers in one of the malarious northern provinces of Luzon, and has since been under suspicion. Russell maintains that A. maculatus must also be regarded as a probable vector. None of the other anophelines found in the Philippine Islands transmit malaria there, although some of them have been found naturally infected in other areas. A. hyrcanus nigerrimus has been doubtfully reported to be infected in Ceylon. The status of A. hyrcanus pseudosinensis, as regards infection with malaria, is uncertain due to the confusion which exists concerning the different varieties of this species. A. lindesayi benguetensis has been reported to be infected in Formosa, and in the Netherlands East Indies A. annularis has been shown to be infected as well as in Formosa and various portions of the Asiatic mainland. A. Kochi, A. subpictus indefinitus, and A. vagus limosus have been found infected in the Netherlands East Indies. The two latter species have also been found infected in India.

a. A. minimus flavirostris breeds by preference in clear, shaded rivers and streams, depositing its larvae among the matted roots of bamboos, or on floating bamboo twigs and leaves. Less frequently it breeds in rivers, irrigation ditches, pools and wells. It is found in foothill areas primarily and does not breed at altitudes above 2,000 feet. It prefers clear water, but specimens have also been taken in muddy water. An annual rise in the adult density of this mosquito begins in November or December, as the rainy season draws to a close, and the rain is no longer sufficient to flush out the streams. During this period the mean temperature and relative humidity are decreasing in the Islands. After this season as the temperature rises, and the mean relative humidity approaches its lowest point, adults become less numerous. With the start of the next rainy season, they begin to appear in larger numbers. Although A. minimus flavirostris frequently enters houses at nights to feed, it does not remain in them, but leaves as soon as its meal is completed. During the daytime adults may be found resting beneath the eroded banks of streams, underneath buildings, and along stone walls. This mosquito feeds readily on both man and animals. Of 1,433 females examined by Laurel in 1930, 1931, and 1934, precipitin tests were positive for human blood in 94 mosquitoes, for carabao blood in 920, and for both in four mosquitoes. With a very moderate wind A. minimus flavirostris can fly approximately a quarter of a mile, while with a strong wind it can fly at least a mile.

b. A. mangyanus deposits its larvae along the margins of clear slowly flowing foothill streams, with sandy or rocky bottoms. It breeds in both forest streams and in sunlit ones. Sometimes its larvae may be found in irrigation ditches. It does not breed at altitudes above 2000 feet. Little information is available concerning the habits of the adult mosquitoes. The flight range of A. mangyanus is approximately half a mile.

c. A. filipinae is a much less common species than either of the two just discussed. In Luzon it is especially rare in the central and southern provinces. Like other members of the funestus-minimus subgroup, it breeds by preference in foot hill streams, but larvae have also been found among the water plants in rivers, following irrigation ditches, pools and lakes. It will breed in either sunlit or shaded, clear or muddy waters. The flight range of A. filipinae is 0.6 of a mile.

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d. A. maculatus breeds by preference in clear streams and in rivers and shows a preference for seepages. Though it usually deposits its larvae in rivers, pools, ditches, and rice fields, and along lake margins. It may be found at all altitudes up to 5000 feet. A. maculatus enters houses to feed, but does not remain in them. It feeds on both man and on carabao, but appears to prefer human blood. In the surveys made by Holt and Russell in 1932 it was the third most common anopheline encountered.

e. None of the Philippine Island anophelines appear to transmit filariasis in the Archipelago, although A. barbirostris is said to be a vector of both W. bancrofti and of W. malayi in Malaya; and of W. malayi in the Netherland East Indies, and A. philippinensis is a vector of W. bancrofti in India. A. barbirostris breeds in the shaded, clear waters of streams, rivers and vegetated ponds, in the pools formed by springs and dams, and in wells and salt water swamps. A. philippinensis breeds in tanks, pools, drains, ditches, swamps, borrow pits, and rice fields.

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STATUS OF MALARIA IN THE PHILIPPINE ISLANDS

Extracted from Report of Medical and
Sanitary Data on the Philippine Islands,
S.G.O., 8th May 1944.

Malaria is by far the gravest disease problem throughout the Philippine Islands, from the view point of military preventive medicine. Prior to the war, between 50,000 and 60,000 cases and 8,000 and 9,000 deaths were reported annually among the civilian population. Russell estimated that it caused about 2,000,000 cases, 20,000 deaths in the Islands each year. Prior to the war the incidence among U.S. troops in this area was extremely low. Although there was a sharp rise in incidence in 1939, bringing rates to 13.8 per 1000 enlisted men, rates in the same group from 1935 to 1938 varied between 1.2 and 4.9 per 1000. This low incidence was the result of painstaking and prolonged malaria control. Troops entering this area under present conditions can expect to be severely crippled by the disease unless adequate control measures are instituted immediately and unremittingly carried out. In most all parts of these islands, malaria is spread by A. minimus flavirostris, although A. mangyanus is thought to be an occasional vector, and A. filipinae and A. maculatus are possible occasional vectors. Tertian malaria is the most common type, while aestivo-autumnal malaria is second in importance. The quartan form of the disease is rare. Since the principal malaria vectors breed in small streams, malaria is primarily a disease of the foot-hill regions. It is not found at altitudes above 2000 feet, and is not a problem in the coastal plains. For the same reason, rice fields and swamps are not important sources of infection, and the disease is more prevalent in small barrios (villages) than in larger towns and cities, since the former are apt to be close to streams. The fact that these mosquitoes are stream breeders makes them dependent on favorable rainfall. During sunny months many streams dry up, while at the height of the rains they are flooded, and the larvae are washed away. Malaria is therefore a disease of the intermediate seasons as well as of the intermediate altitudes. This close relationship between seasonal changes and malaria has been demonstrated by surveys made by the Bureau of Health and by Rockefeller Foundation in various parts of the Archipelago.

Before the war, the Bureau of Health did all in its power to establish effective malaria control, in seriously infected areas. Between 1928 and 1934, as a result of its efforts, the morbidity rate decreased progressively from 593.8 per 100,000 Christian population to 307.7 per 100,000. (Approximately 90 per cent of the total population are Christians.) Between 1934 and 1938, however, the morbidity rate and to a lesser extent, the mortality rate, began to rise again. Unfortunately the Bureau has always been severely handicapped by lack of funds, and has been able to send control units to relatively few areas. Very few communities could afford to finance their own control programs. In rural areas where the population was thin, the houses far apart, and in localities where malaria prevailed in epidemic form, causing considerable mortality, the Bureau of Health limited its control

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measures to the diagnosis of cases, the free distribution of anti-malarial drugs, and the dissemination of information as to the proper use of mosquito nets. Nets made of abaca cloth, with not more than 20, nor less than 16, apertures per linear inch in any direction, were recommended. This system of control was employed in Bataan, Luzon, and throughout the Palawan group of islands.

In heavily populated rural districts where the houses were close together and where malaria was endemic, measures were taken to destroy the larvae of Anopheles minimus flavirostris. This was usually accomplished by spreading Paris green, mixed with fine road dust in the proportion of 1 to 99 parts, on all streams within a radius of one mile from the community to be protected. This was reported each week. Due to the breeding habits of the funestus-minimus subgroup of mosquitoes, stagnant pools of water could usually be safely ignored. Unfortunately, Paris green was too expensive for most small rural communities which would have liked to finance their own malaria control measures. In 1934, the cost involved in its use was estimated to be \$366.00 per 30,000 feet of stream bank per year, not including the cost of supervision, the average Filipino laborer is too ignorant to apply the larvicide systematically. Since the annual sum available for malaria control in poorer areas was seldom over 0.05 cents per capita, per annum, the use of this larvicide was necessarily limited to the wealthier communities.

In rural areas with endemic malaria, where the breeding grounds of the mosquitoes transmitting the disease were not extensive, and where the population was a permanent one, naturalistic control measures included shading, sloping, clearing, damming and periodic sluicing. The control units of the Bureau of Health found these naturalistic methods to be the most suitable in all areas which they surveyed in Laguna Province, in Rosario, La Union; in the Hacienda Mercedes and the Ipo Dam Construction Project in Bulacan, and in La Mesa, Balara, and Montalban Rizal.

In spite of the fact that there has been an alarming increase in malaria since the Japanese occupation, recent reports indicate that no systematic control measures are being enforced. Paris green is no longer obtainable. In spite of the fact that the Japanese - controlled radio has talked a great deal about supplying mosquito nets for the civilian population, it is evident that this has not been done. A certain amount of quinine has, however, been made available. The Japanese radio has also announced that a "Malaria Control Association" is collaborating with the Bureau of Health, and is insisting that all school children in malarious areas be examined and treated if necessary. It is highly doubtful whether, if such an association exists at all, it has made any practical contribution to the suppression of malaria in the Islands. Since the Bureau of Health is now very limited financially, it has probably been obliged to discontinue many of its malaria control projects.

Blackwater fever is another uncommon complication of malaria in the Philippines. Among 23,812 white, United States troops admitted to hospital from 1903 to 1908, only six cases of blackwater fever developed, while over the same period, there were no cases among 11,505 Filipino scouts admitted for malaria. Recently sporadic cases have been reported from Luzon, and the disease is said to be fairly common in southern Palawan. Cases probably sporadically occur on other islands, too, although no information is available.

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Well, well, look who's back -- Lt. Colonel W. V. King has returned to the wars at the 3rd Medical Laboratory, APO 503 and full of pep and vinegar. Anyone wishing to consult him (entomologically speaking) may do so by writing to the above APO. A hearty handshake to you, Colonel King, from "The United Malaria Control and Survey Workers of New Guinea."*

*(Ed's note: Not affiliated with any other labor organization.)

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IT CAN HAPPEN HERE!

This office regrets to report the loss of the services of Major Donald S. Patterson and Major Herold M. Jesurun, who have been rotated to the States, after many months overseas. Their many friends extend to them, best wishes and lots of luck in their new assignments. Major Patterson requested the following statement to be passed on to all. We quote:

"I wish at this time to express my appreciation to all the officers and enlisted men of the malaria organization whom I have known, and with whom I have worked in this theater. The associations have all been pleasant, and the cooperation excellent. Best of luck to all."

Major Jesurun was so stunned by his good fortune that before he could collect his faculties, he was on the boat headed for home. We are certain he would concur in the sentiments expressed by Major Patterson.

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Another novel idea in malaria education comes from the 41st Malaria Survey Unit at APO 928. They report:

"An experiment in malaria education was tried with the initial presentation of a traveling demonstration designed to be set up in Company Day Rooms. Typewritten captions used in regular laboratory demonstrations, scopes, material, and posters were set up in the organization's day room. After a brief talk explaining that the purpose of the demonstration was to show them things about which they had heard in their malaria education lectures, the men, in groups of 30, made a tour of the exhibits. Members of the unit tended the exhibits and answered questions. In this connection, it was noted that the enlisted men, in general, seemed to prefer taking their questions to the enlisted men in the unit. NCOs seemed more disposed to bring questions to the officers. The traveling demonstration was presented to approximately 80 men and officers of the 83rd QM Bn Hq (Mobile). Its reception was encouraging, and it is planned to present it to other organizations as requested.

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The following are recent changes in locations, corrections and addition of omissions to the report given in last month's newsletter.

-- Survey --

17th is now on Biak	31st is now on Morotai
24th is now at Hollandia	220th is enroute from USA

-- Control --

2nd is now at Aitape	101st is now at Hollandia
6th is now on Morotai	102nd " " " "
52nd is in the Admiralties	103rd " " " "
63rd is now at Nadzab	104th " " " "
97th is now at Hollandia	105th " " " "
98th " " " "	106th " " " "
99th " " " "	110th is on Treasury Island
100th " " " "	120th is enroute from USA

-- Malariologists --

Captain White has taken over Major Patterson's former duties.
Captain Sweeney has taken over Major Jesurun's former duties.
Captain Coffey is now 5th AF Malariologist,
Major F. J. Dy has gone to GHQ.

Omissions from last month
Major Wilson Wing, Bougainville
Major Farley, Bougainville
Captain R. W. Monroe, C. Glou.
Captain S. Sparhawk, Finschhafen
Captain G. H. Duerloo, Aitape

~~SECRET~~

TABLE I
DISTRIBUTION OF MALARIA CASES BY AREAS FOR JULY 1944

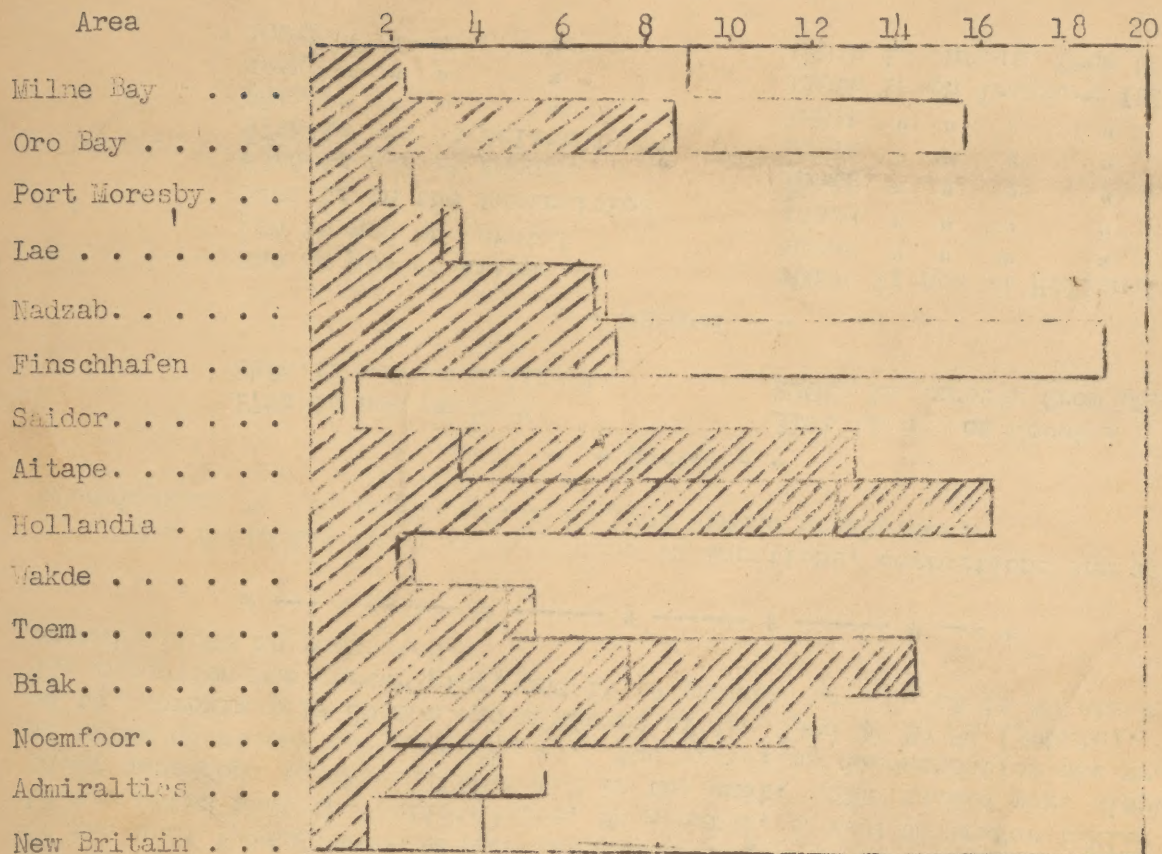
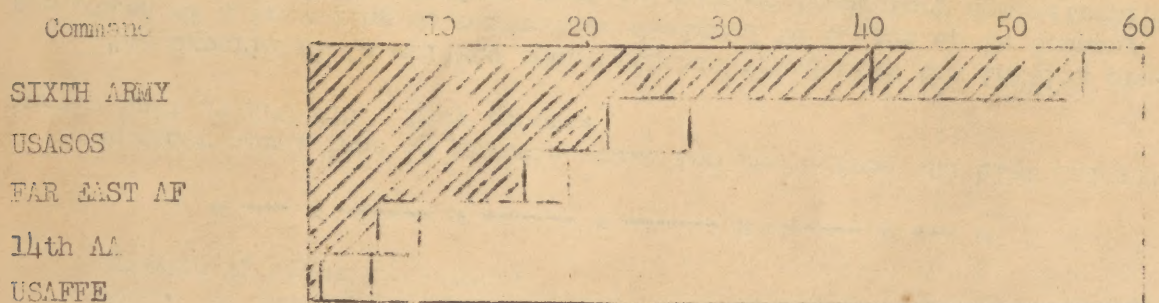


TABLE II
DISTRIBUTION OF MALARIA ATTACKS BY COMMANDS



% Total N.G. Strength
 % Cases

As of: 25 August '44

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"Home for Transient Malaria Personnel"

Where: Hollandia (By-the-drome)
 When: Arriving by Air
 How: Call the 24th Malaria Survey Unit (behind the 134th General Hospital). Featured attractions include bus and transportation schedules and information -- No floor shows and no cover charge. (No running water) *Phone: Lightning 342*

Signs have been posted near telephones on Cyclops and Sentani Airdromes.

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